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SEM STUDY OF THE ANTENNAL SENSILLA AND SETAE OF *SOLVA PALLIPES* (LOEW) (DIPTERA: XYLOMYIDAE)

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Abstract.—The antennal sensilla and setae of both sexes of *Solva pallipes* are described using SEM. Sexual dimorphism is evident on the first flagellomere and its functional significance is postulated.

Light microscope observations of antenna of xylomyids were made by Leonard (1930) and Steyskal (1947) with the latter using antennal characteristics to help separate *Solva* from *Xylomya.* Steyskal indicated *Solva pallipes* (Loew) is widely distributed throughout the Nearctic region. However, much of its biology is poorly known and electron microscopic investigations have not been undertaken.

Other investigators have clearly demonstrated the importance of insect antennal sensilla in perceiving a variety of external stimuli (Acree et al., 1968; Kellogg, 1970; McIver, 1974; Chu-Wang et al., 1975; Zacharuk, 1980). It is anticipated that these SEM observations will be utilized to better understand the structural components of the antennal sensilla and to provide some evidence for their functional role in the behavior of this species.

MATERIALS AND METHODS

Dried specimens of both sexes of *Solva pallipes* were mounted on aluminum studs with silver paint and gold coated in Polaron diode sputterer. Rehydrated specimens were similarly treated and showed less distinctly the sensillar pattern. Critical point drying was, therefore, not deemed desirable. Specimens were examined in an ISI Alpha-9 SEM.

RESULTS AND DISCUSSION

The antennae of xylomyid flies consists of a scape attached to the head, followed by a pedicel and a segmented flagellum. Leonard (1930) indicated

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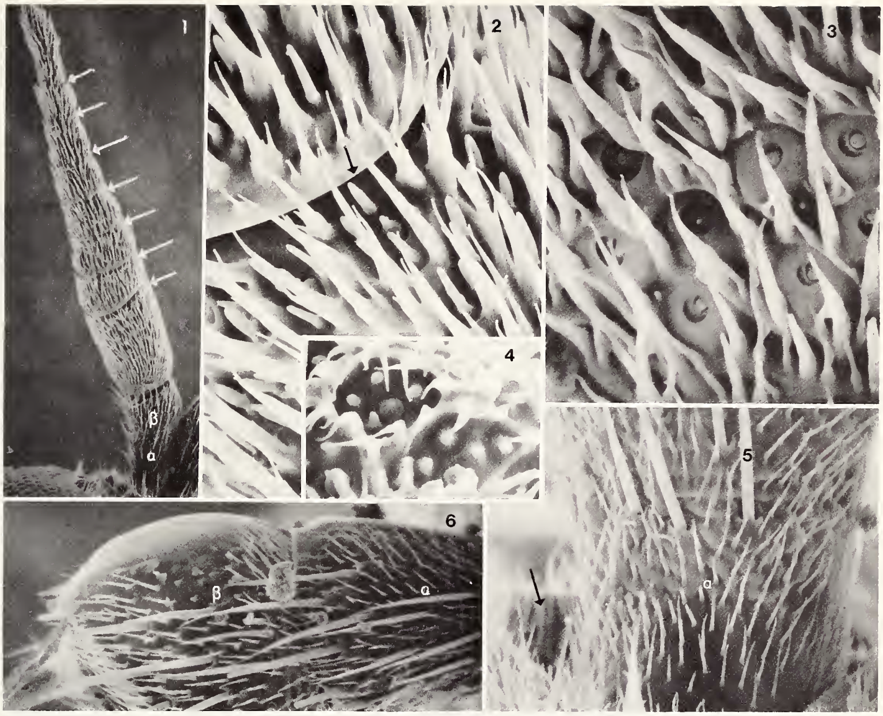

Figs. 1–6. 1. Antenna of female *Solva pallipes* showing scape (α) and pedicel (β). Arrows indicate flagellar annuli. 100×. 2. Flagellar segments demonstrating typical fluted tricoid sensilla. Arrow indicates pattern of depressions near flagellar junction. 100×. 3. Basal segment of male flagellum with typical coeloconicoid sensilla. 2,000×. 4. Depressions of flagellar segments showing two types of sensilla and cuticular wall surrounding each wall. 1,000×. 5. Scape (α) of antenna showing antennal socket (arrow) and pattern of tricoid sensilla. 700×. 6. Lateral view of scape (α) and pedicel (β) showing absence of sensilla on dorsum. 400×.

seven flagellar segments while Steyskal (1947) reported eight for both sexes. The latter number is supported by our studies (Fig. 1).

The flagellum contains a variety of trichoid sensilla and setae having the same pattern of distribution on all segments and being the most frequently encountered type in both sexes. These have evident fluting and are not socketed (Fig. 2). In males, the basal segment bears a large number of coeloconic sensilla which are surrounded by fluted setae (Fig. 3) not found on the female antennae. The basal region of the female antennae bears a uniform pattern of basiconic sensilla. Moreover, the basiconic sensilla are found in both sexes from annulus two through seven, and are always located in "well-like" depressions surrounded by the fluted setae which appear to be elevated on a cuticular wall around the well (Figs. 2, 4). Figure 4 shows the distinct arrangement of five to six basiconicoid sensilla characteristic for a given well, and four to five unfluted basiconicoid sensilla surrounding a shorter fluted sensillum. The "well-like" areas decrease in number as one proceeds distally and were not found on the eighth flagellomere.

The scape arises from an antennal socket and bears large, fluted setae which arise from sockets on the ventral and lateral surfaces. These setae do not occur on the lower one-third of the scape (Fig. 5). This pattern is seen on both sexes. Smaller, non-socketed setae cover the entire scape except for the dorsal surface (Fig. 6). The setal pattern of the upper portion of the scape continues on to the pedicel.

Although specific evidence is not available from this study, Zacharuk (1980) has indicated that coeloconic and basiconic sensilla are generally chemosensory. It is entirely possible, then, that the different sensilla pattern observed on the first flagellomere of the male might be functional in mating.

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